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Irrigation Farming in the Oahe Area Dryland

Rex Helfinstine

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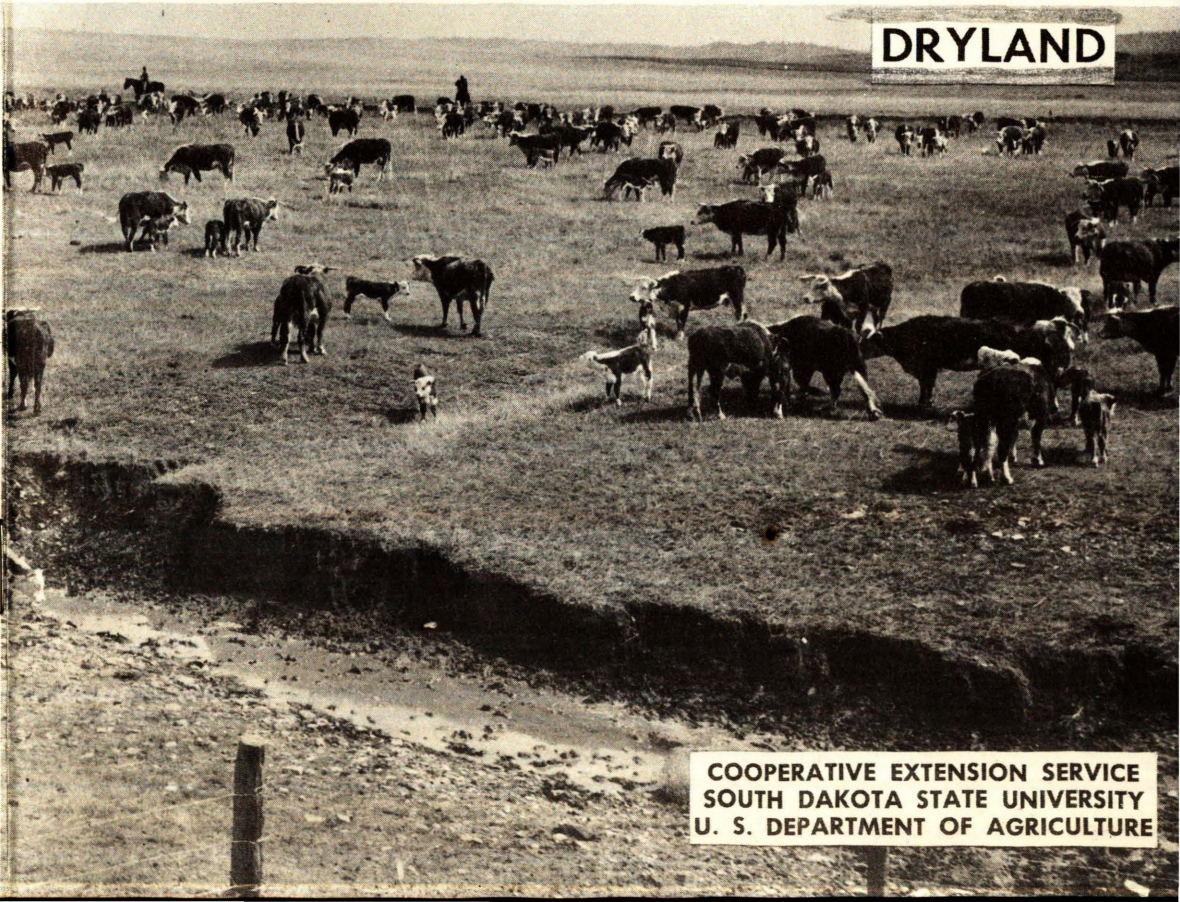
FARMING IN THE OAHE AREA



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Farming in the Oahe Area

❖ Irrigation

❖ Dryland

by
Rex D. Helfinstine
Professor of Economics

"An integrated dryland-irrigated farm in the Oahe area using its feed for fattening feeder cattle and hogs is more profitable than a comparable dryland farm given equal capital requirements and similar organization."

Farmers in the proposed Oahe irrigation area of east-central South Dakota could have water available for irrigation within about 10 years. In less time, however, they must decide if they want to convert part of their dryland to irrigated farming.

A decision must be made shortly because of the:

(1) Necessity of contracting with the Oahe Conservancy Subdistrict and the Bureau of Reclamation for irrigation water supply works and diversion of water from Oahe reservoir, and,

(2) Need to adjust long-range farm plans in line with the decision.

How profitable is irrigation farming as compared to dryland farming? How does this apply to MY farm? Answers to these questions are of major importance to Oahe area farmers.

Material presented here is for comparing representative farms of five sizes in Lake Plains (Brown and Spink Counties) and Missouri Slope (Sully and Potter Counties) areas as shown on the map. Three farm sizes are considered for Lake Plains: 480 acres, 800 acres and 1,280 acres. Two sizes are considered for Missouri Slope: 1,280 acres and 2,560 acres.

General dryland and irrigation farming comparisons are in Part I. Information useful in individual cases is in Part II. More detailed technical and economic information

is in South Dakota State University Experiment Station Bulletin No. B518. County Extension Agents have been provided with this bulletin.

PART I

Irrigation Farming Opportunities

Irrigation farming would require a new technology for farmers in the Oahe area. This would have far-reaching effects on individuals, the region and South Dakota. Maximum benefits can be realized only if individual farmers know how to best use water.

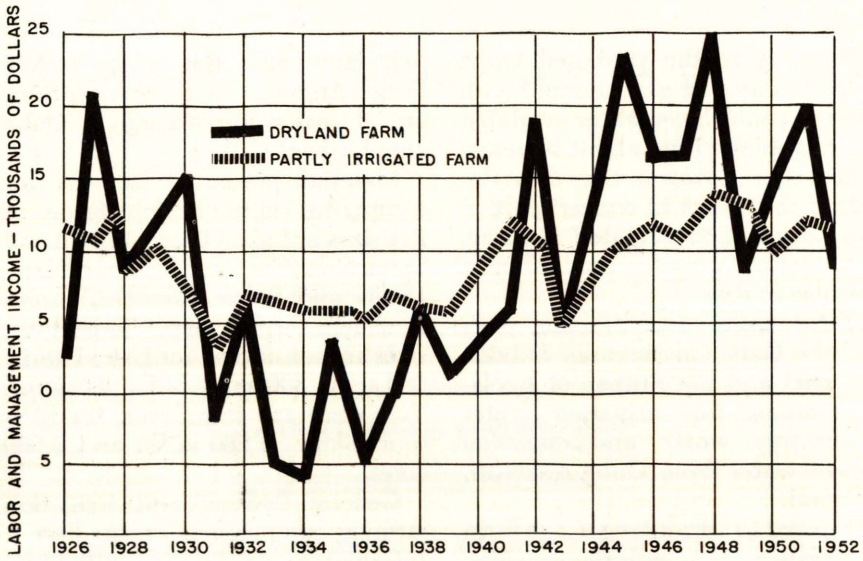
Stabilizing Effect of Irrigation

South Dakota farmers have always been subject to agriculture's ups and downs of production, as well as prices. Irrigation tends to stabilize or level out high and low income and production periods. Investigations show that dryland farm production and income variability is about three times greater than for an irrigated farm.

Learning New Methods For Irrigation Farming

Surface or sprinkler irrigation? Engineering experience and advice is needed to compare operation, land smoothing, and investment costs.

How many years from dryland to irrigation? Consider the time necessary to learn to irrigate and the best use of higher and more dependable crop yields. Also, time is needed to acquire more livestock to use the greater amount of feed to be produced.



Labor and management income is stabilized by irrigation as shown in this chart, based on a previous study, comparing a 1,060-acre dryland cattle-hog farm and 480-acre partly irrigated cattle-hog farm.

Remember, operation and maintenance charges are assessed against irrigable land – irrigated or not. Available capital or credit may mean comparatively rapid land development changeover is more profitable.

How about restoring fertility lost from land smoothing? Usually a combination of commercial fertilizer, manure and legumes is best.

Techniques of Handling Water

Profitable use of irrigation water involves: when and how to irrigate, water requirements of various crops, maintaining pipes or ditches, and keeping land smooth and up to grade.

Farming with More Capital

Irrigation farming requires more capital: for instance, land development including grading; construction of laterals, drains and other structures; clearing, ripping and planing. The Bureau of Reclamation estimates land development costs to average $62 an acre for Lake Plains and $64 for Missouri Slope. Costs for individual tracts may range from minimal to $170 an acre.

More Labor and Equipment

Cleaning ditches, watering crops, maintaining land grade, cultivating smaller fields more intensively—all mean more labor, equipment. Greater problems in weed control can be expected. Labor requirements per acre for irrigated corn are two to three times higher than for dryland.

An 883-acre irrigated farm, for example, would need special equipment: a $900 two-way plow, $1,400 land leveler, a $320 ditcher plus miscellaneous equipment at $400. Less need for a large combine may reduce total equipment costs for irrigated set-up by $3,700. Sugar beets, potatoes or other speciality crops require additional specialized equipment. But cost of mechanized equipment can be more nearly justified with irrigation because of equal year-to-year use.

Integrating Dryland with Irrigation

Most farms within Lake Plains and Missouri Slope areas will integrate dryland with irrigation operations. Several reasons account for this. Much irrigable land is interspersed with non-irrigable land in both areas—Bureau of Reclamation estimates place irrigable land at 56% within Lake Plains and 42% within Missouri Slope. Reclamation law limits the amount of irrigated land to one owner to 160 acres. Husband-wife or husband - wife - children ownership permits additional acreage.

Dryland operations would be integrated with irrigation by using native pasture for beef breeding and feeder cattle raising. Irrigated cropland would furnish a steady source of feed grain and hay to raise hogs and fatten feeder cattle.

Obtaining More Credit

Sources of credit for setting up irrigation are local banks, Production Credit Associations, and the Farmers Home Administration. FHA will loan money without security to farmers unable to obtain credit commercially. A profitable showing

from use of borrowed funds is required before agencies loan money. One great need is an intermediate type of credit for financing additional machinery and livestock, repayable after increased returns come in (after 3 to 5 years).

A credit problem may arise for tenant farmers. Landlords may not be convinced of irrigation profitability or cannot provide $60 to $70 per acre development costs. This might be solved by tenant-financing of irrigation development with a contract agreement for compensation by the landlord in case the tenant leaves.

Expanding Dryland Farms

Instead of investing in irriga-

Siphon tubes carry water from the irrigation ditch to fields. Successful operation of an irrigated farm means knowing when and how to irrigate, water requirements of crops, and maintaining pipes or ditches. Corn grain and silage likely would be important in expanding livestock production. (Bureau of Reclamation Photo.)

tion, why not take the same capital and acquire additional dryland? Comparing irrigated and dryland farms of equal acreage is misleading—irrigated farms require higher investments. But an irrigated farm including livestock is more profitable than a dryland farm of equal capital requirements. That is shown in the comparison of 1,280-acre dryland farm with an 883-acre irrigated farm in Lake Plains—capital requirements are about equal but net returns are estimated to be $15,314 on dryland and $21,743 on irrigated farm (table 1).

Additional dryland for expansion may not be available. Land prices would likely go up if many farmers bought additional land.

Improving State's Economy Through Irrigation

A large irrigation project development like Oahe would tend to boost the economy of the area and all of South Dakota. Higher and more stable farm incomes would help people doing business with farmers. Industrial development, growth of towns and cities are definite possibilities with assured water supplies.

Rural migration, decline of small towns, technological advances requiring fewer farmers to produce needed food, an agriculturally-based economy—combined, these and other factors over the past 25 years have produced a squeeze of rising costs paid by fewer people for rural schools, local government, medical-hospital facilities, and other community services. Oahe reservoir water development offers one hope for reversing the trend in population loss and economic decline.

PART II

COMPARING DRYLAND AND IRRIGATION FARMING

Detailed estimates in Part II provide information to help farmers compare profitability of irrigation and dryland farming on their own farms. These estimated budgets compare irrigation and dryland farming on typical farms in Lake Plains area of Brown and Spink Counties and Missouri Slope area of Sully and Potter Counties. Three sizes of farms are considered typical of Lake Plains: 480 acres, 800 acres and 1,280 acres. Two sizes are considered typical of Missouri Slope: 1,280 acres and 2,560 acres.

Yields, prices, expenses and other requirements are estimated for the 1970's—approximate time for irrigation water to be available in Oahe. Prices and costs are based on the 1956-61 period, except for lower estimates for livestock. A livestock organization was found to be the most profitable under both dryland and irrigated conditions. Analysis of sugar beets in the cropping system was not made for all irrigated farm sizes since a market depends on quotas, location of sugar factory, Congressional legislation and world conditions.

The analysis included average irrigation development costs of $64 per acre (estimated to range from $0 to $170) and yearly irrigation water costs of $9.93 and $10.63 per

acre of irrigable land for Lake Plains and Missouri Slope areas, respectively ($3.55 and $4.25, respectively, for construction charges and $6.38 for annual operation and maintenance costs in both areas). The farms were assumed to include 56% irrigable land in Lake Plains and 42% in Missouri Slope, in line with Bureau of Reclamation land classification estimates.

Prices of various farm products used for budgeting were:

Wheat, bushel	$ 1.90
Oats, bushel	0.50
Corn, bushel	0.90
Slaughter steers, choice, cwt.	25.00
Feeder steers, choice, cwt.	27.40
Hogs, cwt.	15.00

Estimated yields of crops on dry and irrigated cropland, used for budget analysis of Oahe project were:*

	Lake Plains		Missouri Slope	
	Dryland	Irrigated	Dryland	Irrigated
Corn grain, bu.	27	82	19	72
Corn silage, ton	6	15.4	5	13.5
Oats, bu.	38	80	30	80
Wheat, bu.	16	36	28†	40†
Sugar beets, ton	—	17.5	—	17.0
Sugar beet tops, ton	—	1.8	—	1.7
Alfalfa hay, ton	1.6	4.5	1.2	4.5
Native hay, ton	0.8	—	0.6	—
Rotation pasture, AUM‡	2.8	7.9	1.8	7.9
Native pasture, AUM‡	1.0	—	.75	—

*Assumes 100% replacement of nitrogen removed by crops, 100% replacement of phosphorus removed by irrigated crops, 50% replacement of potash removed by irrigated corn for silage.

†Assumes winter wheat after fallow on dryland.

‡AUM means animal unit month or the amount of pasture required to support one mature cow or equivalent for one month.

IRRIGATION IN THE LAKE PLAINS AREA

1,280-Acre Farm

Two assumptions are made on size of irrigated farms to compare with the 1,280 acre dryland farm: (1) it would be the same size with 717 acres of irrigable land; or (2) it would be 883 acres in size with 397 acres sold, leaving 320 acres of irrigable land. Acres of crops used for different budgets were:

	Dryland Farm	Irrigated Farms			
		1,280 acres		883 acres	
	1,280 acres	Dry	Irrig	Dry	Irrig
Corn	410	77	478	77	214
Wheat	237	153	53	153	53
Oats	205	—	67	—	—
Alfalfa	95	—	119	—	53
Native pasture and hay	323	323	—	323	—
Other	10	10	—	10	—
Total	1,280	1,280		883	

Table 1. Comparison of a 1,280-Acre Cattle-Hog Dryland Farm with 1,280-Acre and 883-Acre Cattle-Hog Integrated Irrigation-Dryland Farms, Lake Plains Area.

Item	Unit	Dryland Farm	Integrated Irrigation-Dryland Farms	
		1,280 acres	1,280 acres	883 acres
Dry cropland	acres	947	230	230
Irrigated cropland	acres	—	717	320
Native pasture and hay	acres	323	323	323
Other land	acres	10	10	10
Total	acres	1,280	1,280	883
Beef cows	no.	32	32	32
Feeders purchased	no.	150	829	250
Sows farrowing	no.	60	60	60
Labor used, operator	days	277	342	282
Labor used, hired	days	85	533	181
Total investment*		$176,180	$336,358	$172,310
Total cash receipts		70,205	257,945	99,592
Less cash expenses		41,545	189,296	64,318
Net cash income		28,660	68,649	35,274
Less depreciation†		2,684	3,504	2,627
Net farm income		25,976	65,145	32,647
Less interest on investment		10,662	21,192	10,680
Labor and management income		$ 15,314	$ 43,953	$ 21,967

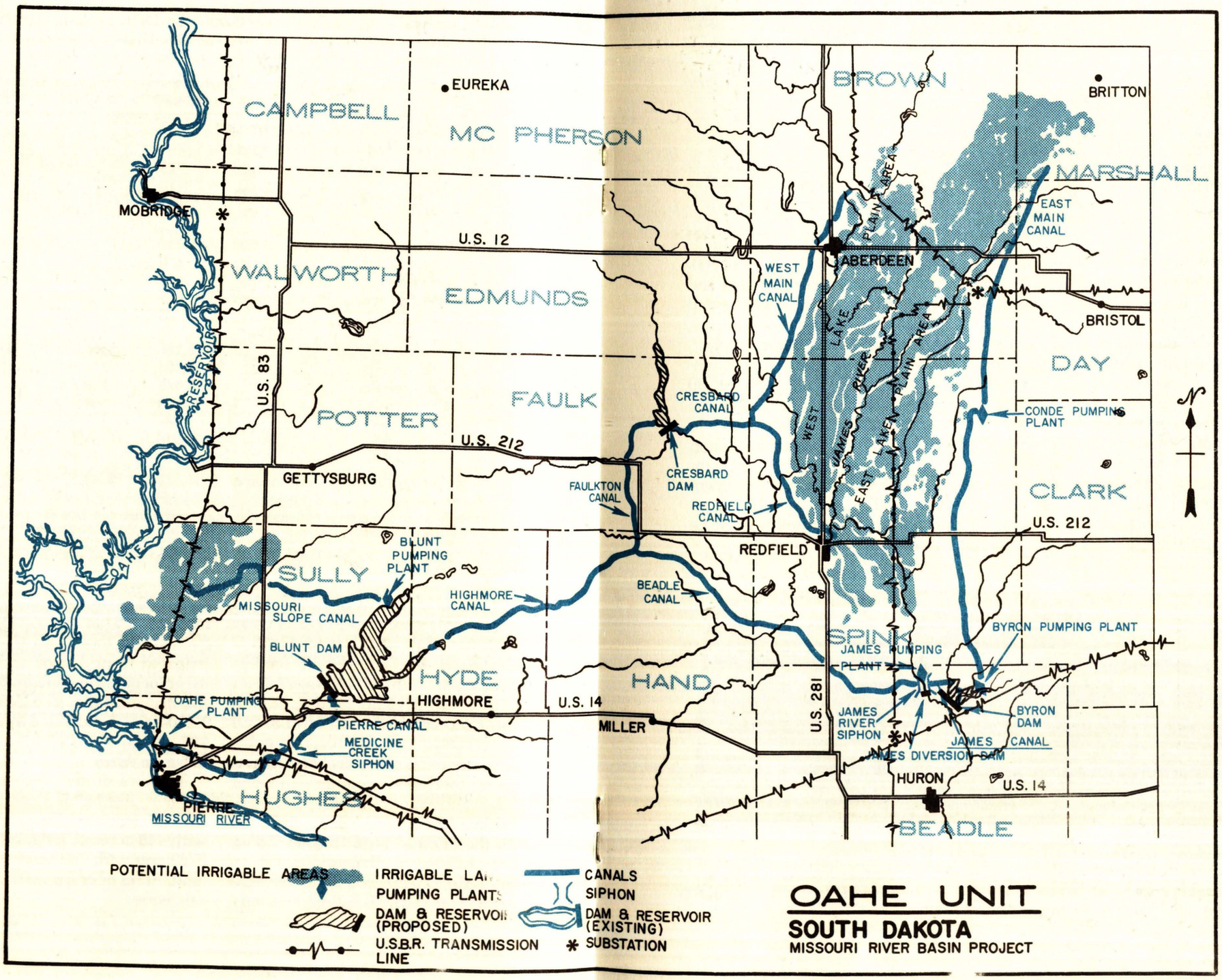
*Investment in machinery, buildings and equipment assumed at half of new cost, in livestock and land at market price.

†Depreciation on machinery and equipment assumed at 10% of investment, on buildings at 3% of investment.

Additional details of the budgets are in table 1. Number of beef cows and sows kept on the three farms is the same, but number of feeders purchased and fed out varies from 150 on the dryland farm to 829 on the 1,280-acre irrigated farm to 250 on the 883-acre farm. Important differences to be noted are total investment, total labor requirements and labor and management income. Total investment varies from $176,180 on the dryland farm to $336,358 on the 1,280-acre irrigated farm to $172,310 on the 883-acre irrigated farm. Total labor requirements vary from 362 man-days on the dryland farm to 875 on the 1,280-acre irrigated farm to 463 on the 883-acre irrigated farm. Labor and management income varies from $15,314 on the dryland farm to $43,953 on the 1,280-acre irrigated farm to $21,967 on the 883-acre irrigated farm.

800-Acre Farm

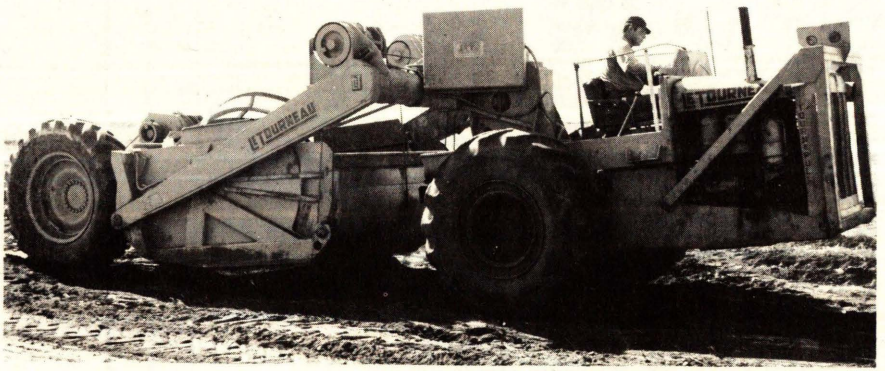
Analyses of the budgets for the 800-acre size farms also assume two sizes of irrigated farm: 800 acres with 448 acres of irrigable land and 672 acres with 320 acres of irrigable land. Acres of crops used in the analysis were:


EUREKA
CAMPBELL
MC PHERSON
BROWN
BRITTON
MARSHALL
MOBRIDGE
U.S. 12
WALWORTH
EDMUNDS
ABERDEEN
EAST MAIN CANAL
WEST MAIN CANAL
BRISTOL
DAY
RESERVOIR
U.S. 83
POTTER
FAULK
CRESBARD CANAL
CONDE PUMPING PLANT
U.S. 212
GETTYSBURG
CRESBARD DAM
FAULKTON CANAL
REDFIELD CANAL
CLARK
REDFIELD
U.S. 212
OAHE
BLUNT PUMPING PLANT
SULLY
MISSOURI SLOPE CANAL
HIGHMORE CANAL
BEADLE CANAL
BLUNT DAM
SPINK
JAMES PUMPING PLANT
BYRON PUMPING PLANT
HYDE
HAND
OAHE PUMPING PLANT
HIGHMORE
U.S. 14
MILLER
U.S. 281
PIERRE CANAL
MEDICINE CREEK SIPHON
JAMES RIVER SIPHON
BYRON DAM
JAMES CANAL
JAMES DIVERSION DAM
HUGHES
PIERRE
MISSOURI RIVER
HURON
U.S. 14
BEADLE
POTENTIAL IRRIGABLE AREAS
IRRIGABLE LA
PUMPING PLANTS
DAM & RESERVOIR (PROPOSED)
U.S.B.R. TRANSMISSION LINE
CANALS
SIPHON
DAM & RESERVOIR (EXISTING)
SUBSTATION
OAHE UNIT
SOUTH DAKOTA
MISSOURI RIVER BASIN PROJECT

	Dryland Farm	Irrigated Farms			
		800 acres		672 acres	
	800 acres	Dry	Irrig	Dry	Irrig
Corn	225	47	299	47	214
Wheat	148	95	53	95	53
Oats	128	—	21	—	—
Alfalfa	59	—	75	—	53
Native pasture and hay	200	200	—	200	—
Other	10	10	—	10	—
Total	800	800		672	

Further details from these budgets are shown in table 2. The dryland farm has adequate roughage for 20 beef cows and both irrigated farms have enough for 32. Grain supplies are adequate for: 52 sows and 65 feeders on the dryland farm, 50 sows and 430 feeders on the 800-acre irrigated farm, and 50 sows and 250 feeders on the 672-acre farm. Total investment is $111,375 on the dryland farm, $209,902 on the 800-acre irrigated and $155,825 on the 672-acre irrigated farm. Total labor requirements are 257, 541 and 412 man-days, respectively, for the 800-acre dryland, 800-acre irrigated and 672-acre irrigated farms. Labor and management returns were $9,102, $25,324, and $19,033 respectively.

Comparison of the 672-acre irrigated farm with and without 60 acres of sugar beets is made in table 2. Growing sugar beets appears to be quite profitable with a labor and management return of $26,292 compared to $19,033 when not grown. However, labor and capital requirements are increased, and it must be assumed a market is available.



Land smoothing, required for gravity irrigation, is one costly but necessary operation done initially by heavy equipment. Deep cuts will require recommended practices for fertility restoration. Where leveling is not economical, sprinkler irrigation may be used. (Bureau of Reclamation Photo.)

Table 2. Comparison of an 800-Acre Cattle-Hog Dryland Farm with 800-Acre and 672-Acre Cattle-Hog Integrated Irrigation-Dryland Farms, with and without 60 acres of Sugar Beets, Lake Plains Area.

Item	Unit	Dryland Farm	Integrated Dryland-Irrigation Farms		
			Without sugar beets		With sugar beets
		800 acres	800 acres	672 acres	672 acres
Dry cropland	acres	590	142	142	142
Irrigated cropland	acres	—	448	320	320
Native pasture and hay	acres	200	200	200	200
Other land	acres	10	10	10	10
Total	acres	800	800	672	672
Beef cows	no.	20	32	32	36
Feeders purchased	no.	65	430	250	265
Sows farrowing	no.	52	50	50	30
Labor used, operator	days	240	275	256	258
Labor used, hired	days	17	266	156	222
Total investment*		$111,375	$209,902	$155,825	$162,535
Total cash receipts		39,478	144,210	94,606	108,325
Less cash expenses		21,376	102,616	63,376	69,124
Net cash income		18,102	41,594	31,230	39,201
Less depreciation†		2,247	3,050	2,447	2,689
Net farm income		15,855	38,544	28,783	36,512
Less interest on investment		6,753	13,220	9,750	10,220
Labor and management income		$ 9,102	$ 25,324	$ 19,033	$ 26,292

*Investment in machinery, buildings and equipment assumed at half of new cost, in livestock and land at market price.

†Depreciation on machinery and equipment assumed at 10% of investment, on buildings at 3% of investment.

480-Acre Farm

The 480-acre dryland farm has 355 acres of cropland and 119 acres of native pasture and hay. As an irrigated farm, 269 acres of the cropland would be irrigable. Acres of crops for the two situations are budgeted as follows:

	Dryland Farm	Irrigated Farm	
		Dry	Irrigated
Corn	147	43	179
Wheat	89	43	45
Oats	73	—	—
Alfalfa	46	—	45
Native pasture and hay	119	119	—
Other	6	6	—
Total	480	480	

Table 3. Comparison of a 480-Acre Cattle-Hog Dryland Farm, with a 480-Acre Cattle-Hog Integrated Irrigation-Dryland Farm, Lake Plains Area.

Item	Unit	Dryland	Integrated Irrigation-Dryland
Dry cropland	acres	355	86
Irrigated cropland	acres	—	269
Native pasture and hay	acres	119	119
Other land	acres	6	6
Total	acres	480	480
Beef cows	no.	12	20
Feeders purchased	no.	40	200
Sows farrowing	no.	31	50
Labor used, operator	days	182	248
Labor used, hired	days	—	109
Total investment*		$ 66,825	$123,651
Total cash receipts		23,965	76,404
Less cash expenses		12,742	51,117
Net cash income		11,223	25,287
Less depreciation†		1,329	2,394
Net farm income		9,894	22,893
Less interest on investment		4,051	7,971
Labor and management income		$ 5,843	$ 14,922

*Investment in machinery, buildings and equipment assumed at half of new cost, in livestock and land at market price.

†Depreciation on machinery and equipment assumed at 10% of investment, on buildings at 3% of investment.

Table 3 presents further details on the budgets. Feed supplies on the dryland farm are adequate for 12 beef breeding cows, fattening 40 purchased feeders, and raising 31 litters of pigs. The irrigated farm produces feed for 20 beef breeding cows, fattening 200 purchased feeders, and raising 50 litters of pigs. Total investment is $66,825 on the dryland farm and $123,651 on the irrigated farm. Total labor requirements are 182 man-days and 357 man-days, respectively. Labor and management returns are $5,843 and $14,922.

IRRIGATION IN THE MISSOURI SLOPE AREA

2,560-Acre Ranch

The 2,560-acre dryland ranch in the Missouri Slope area is compared with 2,560-acre and 1,805-acre irrigated ranches. As a dryland ranch it included 1,024 acres of cropland and 1,521 acres of native range and hay. The 2,560-acre irrigated ranch has 1,075 acres of irrigated cropland, while the 1,805 acre ranch has 320 acres of irrigated cropland. Irrigating 1,075-acres of land in addition to operating the rest of the

2,560 acre irrigated ranch would require considerable managerial skill and capital. Acreages of crops budgeted for these ranches were:

	Dryland Ranch 2,560 acres	Irrigated Ranches			
		2,560 acres		1,805 acres	
		Dry	Irrig	Dry	Irrig
Corn	257	—	717	—	214
Wheat	358	—	179	—	53
Oats	128	—	—	—	—
Alfalfa	102	—	179	—	53
Fallow	179	—	—	—	—
Native range and hay	1,521	1,470	—	1,470	—
Other	15	15	—	15	—
Total	2,560	2,560		1,805	

Sugar beets provide a profitable cash crop where marketing facilities and quotas are available. Special equipment and techniques are required for this crop. Sugar beet tops are used for livestock feed. (Bureau of Reclamation Photo.)

Table 4. Comparison of a 2,560-Acre Cattle-Hog Dryland Ranch with 2,560-Acre and 1,805-Acre Cattle-Hog Integrated Irrigation-Dryland Ranches, Missouri Slope Area

Item	Unit	Dryland Ranch	Integrated Irrigation-Dryland Ranches	
		2,560 acres	2,560 acres	1,805 acres
Dry cropland	acres	1,024	—	—
Irrigated cropland	acres	—	1,075	320
Native pasture and hay	acres	1,521	1,470	1,470
Other land	acres	15	15	15
Total	acres	2,560	2,560	1,805
Beef cows	no.	92	100	90
Feeders purchased	no.	—	1,010	125
Sows farrowing	no.	22	30	58
Labor used, operator	days	268	358	283
Labor used, hired	days	63	775	158
Total investment*		$212,250	$453,990	$193,280
Total cash receipts		40,030	320,685	72,475
Less cash expenses		11,474	234,406	40,499
Net cash income		28,556	86,279	31,976
Less depreciation†		2,713	3,704	2,685
Net farm income		25,843	89,575	29,291
Less interest on investment		12,707	28,566	11,947
Labor and management income		$ 13,136	$ 54,009	$ 17,344

*Investment in machinery, buildings and equipment assumed at half of new cost, in livestock and land at market price.

†Depreciation on machinery and equipment assumed at 10% of investment, on buildings at 3% of investment.

Other details from the budgets are presented in table 4. Each ranch carries from 90 to 100 beef breeding cows. The 2,560-acre irrigated ranch purchased and fed out 1,010 feeders, compared with 125 for the 1,805 acre ranch. The dryland ranch raised 22 litters of pigs and irrigated ranches 58 and 30 litters, respectively. Total investment is $212,250, $453,990, and $193,280, respectively, for dryland, 2,560-acre irrigated and 1,805 acre irrigated ranches. Total labor requirements are 331, 1,133, and 441 man-days, respectively. Labor and management incomes are $13,136, $54,009 and $17,344, respectively.

1,280-Acre Ranch

The 1,280-acre dryland ranch, having 512 acres of cropland and 753 acres of native range and hayland, is compared with a 1,280-acre and a 1,062-acre irrigated ranch. The 1,280-acre irrigated ranch has 538 acres of irrigated land, the 1,062-acre ranch, 320 acres. Acres of crops on these ranches were:

	Dryland Ranch	Irrigated Ranches			
		1,280 acres		1,062 acres	
	1,280 acres	Dry	Irrig	Dry	Irrig
Corn	125	—	359	—	2 14
Wheat	180	—	89	—	53
Oats	65	—	—	—	—
Alfalfa	52	—	90	—	53
Fallow	90	—	—	—	—
Native range and hay	753	727	—	727	—
Other	15	15	—	15	—
Total	1,280	1,280		1,062	

Other budgetary details are presented in table 5. Each ranch carries 43 to 52 beef breeding cows. The 1,280-acre irrigated ranch purchased and fed out 417 feeders, the 1,062-acre ranch 237 head. Eleven lit-

Table 5. Comparison of a 1,280-Acre Cattle-Hog Dryland Ranch with a 1,280-Acre and 1,062-Acre Cattle-Hog Integrated Irrigation-Dryland Ranches, Missouri Slope Area

Item	Unit	Dryland Ranch	Integrated Irrigation-Dryland Ranches	
		1,280 acres	1,280 acres	1,062 acres
Dry cropland	acres	512	—	—
Irrigated cropland	acres	—	538	320
Native pasture and hay	acres	753	727	727
Other land	acres	15	15	15
Total	acres	1,280	1,280	1,062
Beef cows	no.	45	52	43
Feeders purchased	no.	—	417	237
Sows farrowing	no.	11	55	30
Labor used, operator	days	194	313	255
Labor used, hired	days	—	326	137
Total investment*		$114,260	$223,332	$156,975
Total cash receipts		19,697	146,359	86,775
Less cash expenses		6,028	103,434	59,079
Net cash income		13,669	42,925	27,696
Less depreciation†		2,220	2,789	2,427
Net farm income		11,449	40,136	25,269
Less interest on investment		6,923	14,026	9,852
Labor and management income		$ 4,526	$ 26,110	$ 15,417

*Investment in machinery, buildings and equipment assumed at half of new cost, in livestock and land at market price.

†Depreciation on machinery and equipment assumed at 10% of investment, on buildings at 3% of investment.

ters of pigs were raised on the dryland ranch, 55 litters on the 1,280-acre irrigated, and 30 litters on the 1,062 acre. Total capital requirements were $114,260, $223,332, and $156,975, respectively, for dryland, 1,280-acre irrigated, and 1,062-acre irrigated ranches. Total labor requirements were 194, 639, and 392 man-days, respectively. Labor and management incomes were $4,526, $26,110, and $15,417, respectively.

These budgets indicate an integrated dryland-irrigated farm in the Oahe area using its feed for fattening feeder cattle and hogs is more profitable than a comparable dryland farm, given equal capital requirements and similar organization.

Canal systems such as this carry irrigation water to smaller ditches for distribution to farms.

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